

## Warm Up #12-1

Review Simple &amp; Compound Interest:

$$A = P(1 + r)^t$$

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

1. You invest \$5000 in an account that pays 4.65% annual interest. How much money will you have after 10 years?
2. How much will you have if it is compounded quarterly? Monthly?

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = ending amount

P = initial amount

r = interest rate  
(as a decimal)n = number of times  
compounding in a year

t = number of years

$$FV = PV \left(1 + \frac{r}{100k}\right)^{kn}$$

FV = ending amount

PV = initial amount

r = interest rate  
(as a percent)k = number of times  
compounding in a year

n = number of years

$$FV = PV \left(1 + \frac{r}{100k}\right)^{kn}$$

? FV = ending amount  
 2500 PV = initial amount  
 5.24% r = interest rate  
 (as a percent)  
 4 k = number of times  
 compounding in a year  
 10 n = number of years

You want to invest \$2500 at 5.24% compounded quarterly. Identify each of the variables in the formula.

How much will you have in 10 years?

$$\begin{aligned}
 FV &= 2500 \left(1 + \frac{5.24\%}{100}\right)^{4(10)} \\
 &= 2500 \left(\frac{4.0524}{4}\right)^{40} \\
 &\approx \$4207.58
 \end{aligned}$$

## Our last topic of the term: Logic

### Definition of "proposition"

A **proposition** is a statement. It could be true, false, or indeterminate.

*Not a question.*

It's noted with a lower case letter, like **p**.

A capital letter, like **P**, would name the set whose elements have the characteristics of the **proposition p**.

Truth tables: show the truth values of propositions.

For 2 propositions, p & q:

p	q
T	T
T	F
F	T
F	F

$p \wedge q$
T
F
F
F

Means "p **and** q"

The intersection of P and Q,  $P \cap Q$

Truth tables: show the truth values of propositions.

For 2 propositions, p & q:

p	q		$p \vee q$
T	T		T
T	F		T
F	T		T
F	F		F

$p \vee q$

Means "p **or** q **or** both"

The union:  $P \cup Q$

## Classwork: (Pink WS)

*Words and symbols*

Fill in the blanks in the table from the list of terms below.

Symbol	Meaning	Technical term
$\wedge$		<u>conjunction</u>
	<u>or</u>	
	<u>or</u> but not both	
	<u>if</u> then	
$\Leftrightarrow$		<u>equivalence</u>
$\neg$	<u>not</u>	

Use these terms.....

$\vee$ , if and only if, negation,  $\Rightarrow$ , Exclusive disjunction, and, disjunction,  $\vee$ , implication

## Classwork: (Pink WS)

*Words and symbols*

Fill in the blanks in the table from the list of terms below.

Symbol	Meaning	Technical term
$\wedge$	<i>and</i>	<u>conjunction</u>
$\vee$	<u>or</u>	<i>disjunction</i>
$\underline{\vee}$	<u>or</u> but not both	<i>exclusive disjunction</i>
$\Rightarrow$	<u>if</u> then	<i>implication</i>
$\Leftrightarrow$	<i>if &amp; only if</i>	<u>equivalence</u>
$\neg$	<u>not</u>	<i>negation</i>

Use these terms.....

$\vee$ , if and only if, negation,  $\Rightarrow$ , Exclusive disjunction, and, disjunction,  $\vee$ , implication

*the opposite of the original statement*

2.

p: I'm a duck.

q: It is raining

r: I run.

Symbols	Words
$p \wedge q$	
$p \Rightarrow q$	
$r \wedge q \Rightarrow p$	
$r \vee q$	
$\neg q \Rightarrow r$	
$\neg p \wedge r \Rightarrow \neg q$	

2.

p: I'm a duck.

q: It is raining

r: I run.

Symbols	Words
$p \wedge q$	I'm a duck and it's raining
$p \Rightarrow q$	If I'm a Duck, then it's raining
$(r \wedge q) \Rightarrow p$	If I run and it's raining then I'm a Duck
$r \vee q$	I run or it's raining or both.
$\neg q \Rightarrow r$	If it's not raining then I run
$\neg p \wedge r \Rightarrow \neg q$	If I'm not a duck and I run then it's not raining

### 3. Now try the process in reverse with these different propositions.

a: I am going to France  
b: I passed my exams  
c: I worked hard

Symbols	Words
	I worked hard and passed my exams
	I passed my exams or I am going to France
	If I didn't work hard I didn't pass my exams
	If I am going the France then I either I passed my exams or I worked hard
	I am going to France if and only if I passed my exams
	I worked hard or didn't pass my exams but not both

### 3. Now try the process in reverse with these different propositions.

a: I am going to France  
b: I passed my exams  
c: I worked hard

Symbols	Words
$c \wedge b$	I worked hard and passed my exams
$b \vee a$	I passed my exams or I am going to France
$\neg c \rightarrow \neg b$	If I didn't work hard I didn't pass my exams
$a \rightarrow (b \vee c)$	If I am going <del>the</del> France then I either I passed my exams or I worked hard
$a \leftrightarrow b$	I am going to France if and only if I passed my exams
$c \vee \neg b$	I worked hard or didn't pass my exams but not both

Arithmetic sequences:

The  $n^{\text{th}}$  term:  $u_n = u_1 + d(n-1)$

Arithmetic **SERIES**: the **sum** of the terms in a sequence.

$$S_n = \frac{n}{2}(2a_1 + d(n-1))$$



Geometric sequences

The  $n^{\text{th}}$  term:  $u_n = u_1(r)^{n-1}$

Geometric Series:  $S_n = \frac{g_1(r^n - 1)}{r - 1}$

Let's finish this! Good review for your quiz tomorrow.

Classwork: *from last week*

5E.1 p. 141, # 1, 2, 4be, 5, 7, 8b

5E.2 p. 144, # 1, 2abc, 3bc, 6ab

Getting ready for tomorrow:

HW Quiz

Rev. Set 20A, p. 582 # 1 - 8

Rev. Set 9B, p. 297 # 5b

Rev. Set 9C, p. 298 # 3

5C, p. 132

Mock Exam Paper 1

HW: Rev. Set 5A p. 154,  
# 2 - 5, 7ac, 9

Check Mock Exam Paper 2  
answers posted on the website.

(Click IB Exam Resources)

Last Quiz: tomorrow  
Sequences and Series